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Title: What's the big deal with TA-55's trash?

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What's the big deal with TA-55's trash?



There's a beast of hazardous waste, and we're learning how to tame it

Plutonium and production activities are ongoing at TA-55, which means the beast of hazardous waste is always looming around the corner.

The Laboratory must dispose of this delicate type of waste properly and swiftly. Learning from previous snags and pitfalls in an incredibly complex process, TA-55 leadership and staff have worked together to greatly improve and streamline waste processes.

The result: As of the last week of fiscal year 2020, 42 shipments containing **1,275 containers of transuranic (TRU) waste** were sent to the **Waste Isolation Pilot Plant (WIPP)** in southern New Mexico, the nation's only repository for defense-generated TRU waste. In FY 2019, we shipped less than half that amount.

As drums go down, productivity goes up



Pre-COVID-19, Nuclear Process Infrastructure (NPI) team members hold a stand-up meeting to prepare for loading a shipment.

Production in TA-55's Plutonium Facility (PF-4) that supports the Lab's national security mission — including [pits](#), [heat sources](#) and [plutonium disposition](#) — would be impossible if we couldn't tame the beast of hazardous waste.

Not long ago, hundreds of drums were taking up all the inventory space, and there was no room for more, which meant pit production and other processes in PF-4 had a roadblock with nowhere to put their waste.

Today, teams within pit production, actinide operations, and waste processing are all collaborating closely to keep the flow of production and waste moving right along, not only to move the mission forward but to ensure the ongoing safety of everyone — inside and outside of TA-55.

Improvements made around TA-55 have led to big results in FY20, and there's a domino effect: As shipping has increased exponentially, inventory (or drums in storage waiting to be moved) has reduced to its lowest in years. **Inventory at TA-55 has been reduced by 46% this fiscal year, removing a roadblock to production and reducing risk for both compliance and criticality safety.**

All the processes along the way have been streamlined, thanks to motivated employees who are doing things differently (even during a pandemic).

Sorting TA-55's trash



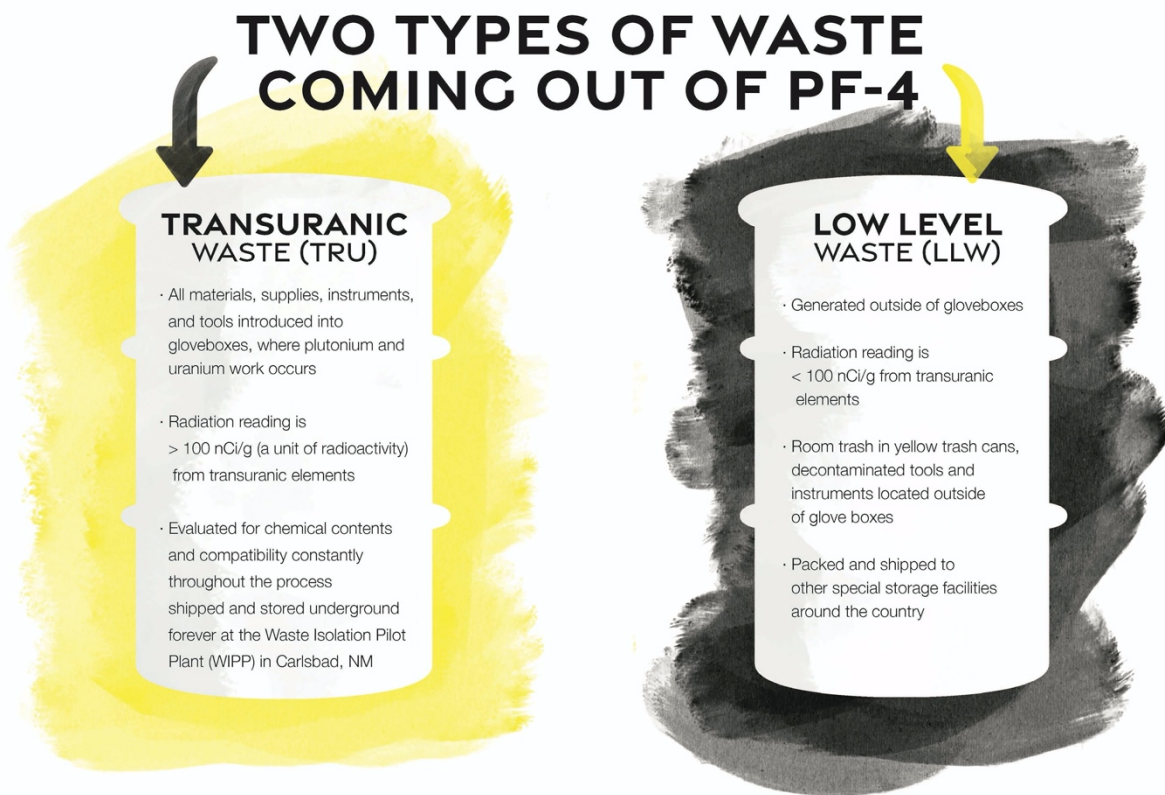
Two sample TRU waste drums, split open, show the typical contents. On the left, a drum primarily containing materials and debris such as pipe, equipment parts, tools, plastic bags, and tape. On the right, a drum full of used cleaning cloths and wipes.

When some folks think of nuclear waste, they picture an overflowing vat of radioactive green slime. While the contents of the drums of waste coming out of PF-4 vary — liquids, slime and sludge are actually never present.

PF-4 produces two types of waste — transuranic waste and low-level waste. **All of it is an unavoidable result of the production processes that support national security, and is all handled with extreme rigor.**

According to the Department of Energy, transuranic (TRU) waste “contains manmade elements heavier than uranium, hence the name ‘trans’ or ‘beyond’ uranium. Transuranic waste material generally includes objects and materials associated with the human manipulation of fissionable material such as clothing, tools, soil and debris.”

So the TRU waste coming out of PF-4 is actually made up of those items such as gloves, tools and clothing that have come in contact with special nuclear materials. Scraps and residues, most of which are a result of the chemical processes needed to produce metals for pit production and other national security missions, can be in the mix, too.



How hard can this be?

We all know how to take out the trash, but most of us can't believe what that's like at TA-55.

Imagine sitting down to make your weekly meal plan and grocery list, jotting down your go-to dinners while looking up a few new recipes on your phone, then simply recording it onto a single sheet of paper before heading to the store. Now, imagine that before you can even go to the store, you also need to account for every ounce of waste that will come out of the next week's eating — every plastic package, vegetable cutting and banana peel — and get a series of approvals to dispose of it in your trash, compost or recycling bin, all before you can even think about cooking it up.

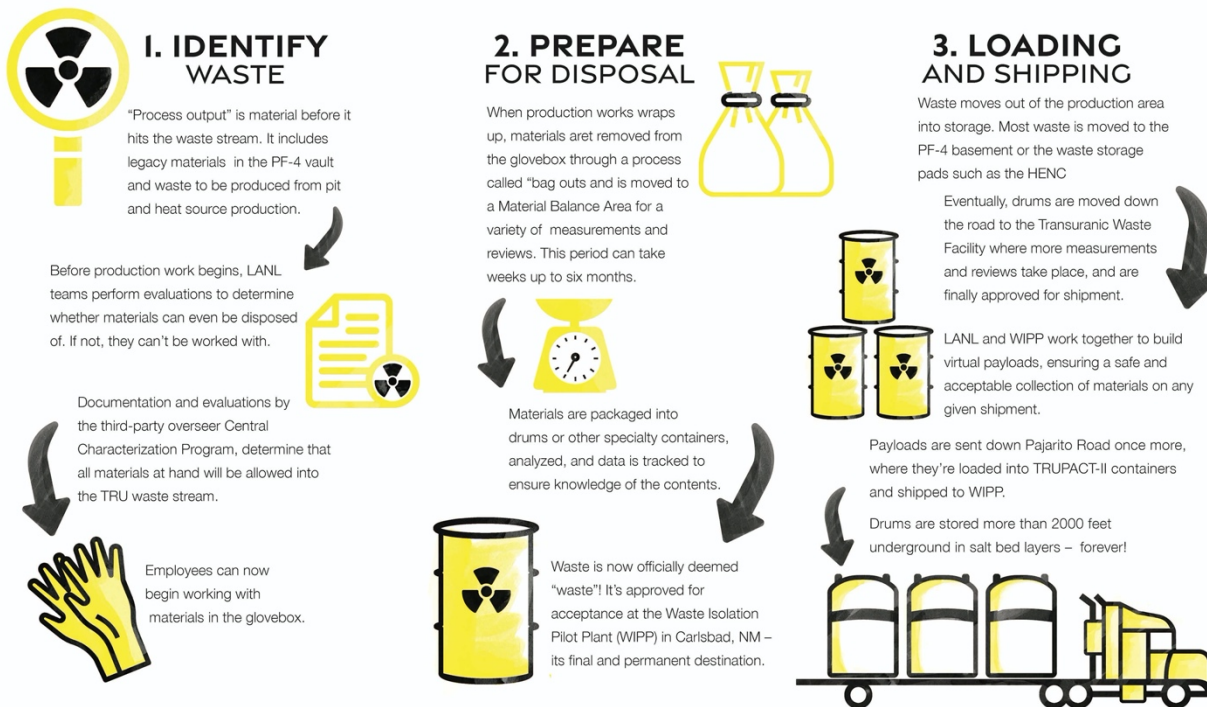
At PF-4, this is a bit of what it's like. An elaborate process determines what the waste is and where it's going, even before it's produced.

Follow the journey of TRU waste at PF-4

Before production work inside PF-4 can even begin, the waste that it will produce is already known, characterized and assigned for its destination. Multiple layers of evaluations and approvals take place by both internal and external parties all along the way.

Follow this journey of waste coming out of PF-4 to see what happens from pre-production to full disposal.

THE PATH OF TRU WASTE AT TA-55



What made the difference?

Changes to staffing, processes, equipment, oversight

In the past year, the Associate Laboratory Directorate of Weapons Production (ALDWP) has

- increased the number of personnel
- implemented and updated material tracking software
- acquired new equipment to keep employees and materials safer

Additionally, portions of ALDWP went through a re-organization, establishing new levels of oversight by a new "super-division," Environment and Waste Programs, that is directly tied to counterpart divisions within the Environment, Safety, Health, Quality, Safeguards and Security Directorate (ESHQSS).

Employee-driven safety and efficiency



A TRU-PACT II container is loaded with strategically selected TRU waste drums.

At the [High Efficiency Neutron Counter \(HENC\) pad](#), which is a staging and transport location for waste drums, employees took their own initiative to improve safety for themselves and increase efficiency. They acquired new equipment that increased their productivity tenfold, allowing them to prepare 30 drums for shipment in half a day, when previously it took the full work week.

Nestor Trujillo, group leader for Hazardous Material Shipping in the Nuclear Process Infrastructure (NPI) Division, helps manage the HENC team and several other teams working the complex puzzle of TRU waste shipping. As they receive information on drum contents, Trujillo's team works directly with WIPP to determine exactly which drums can be shipped together, building virtual payloads to ensure material safety.

This process takes not only many steps, but involves many locations across the Pajarito corridor. “We have the facilities, infrastructure and reporting in place to make a safe and secure environment,” Trujillo said.

Trujillo has also been increasingly impressed by the innovation and drive of his group’s members. As a group that hardly stopped working on-site when the pandemic first struck in March, he’s seen the employees’ commitment not only to the work, but to the safety measures required to move TRU waste.

“People are our most vital resource needed to make and meet our mission critical deliverables,” Nestor Trujillo said. “We consider our workforce to be our most precious asset.”



Closing knowledge gaps

Inside PF-4, **Rebecca Hollis**, group leader of Hazardous Waste Management, and her group find that a little education early on can increase collaboration and reduce obstacles along the way. If employees doing the production work, which creates material for discard (also known as process output, or waste before it’s deemed “waste,”), can understand the full picture of how the material is governed, there will be fewer questions about waste and how to move it out.

“Many people don’t understand that process outputs are governed by the Atomic Energy Act and cannot be discarded just because the process is no longer using the material. There are a lot of requirements that have to be met before a process output officially becomes waste,” Hollis explained. “We are working on teaching that paradigm to PF-4 operating groups, so they can better understand their role in the process all along the way.”

The Nuclear Process Infrastructure Division is encouraging a more robust approach. **“We’re building up technical competencies in all these areas to make sure that we’ve got the expertise to deal with any issues we might encounter,”** Hollis said.

Currently, the members of her group collectively have hundreds of years of experience working with WIPP, and are made up of environmental professionals, chemists, environmental engineers, material scientists, filter experts, and technicians with experience working in numerous processes in PF-4.



Radiological control technicians Jason Beddeson (right) and Sean Sandoval train on a bag-out, which is the process of safely removing materials from a glovebox. Their work helps to verify that the radiological dose of the contents is allowable and expected as it's removed for processing.

Sending waste to its forever home

Employees in Weapons Production are continuing to ramp up efforts to clear out TRU waste from TA-55, get it onto trucks and send it into the 2,000-foot deep salt layers in Carlsbad. **The high shipping rates of recent months are expected to continue indefinitely in order to clear out existing inventory and prepare to keep up with higher production rates in the future.**

“Weapons Production’s national security missions will continue to produce TRU waste and a vital part of the mission is to dispose the waste safely, compliantly, and effectively,” said **Chris James**, division leader for Nuclear Process Infrastructure. **“Our employees are dedicated to ensuring the safety of Northern New Mexico by getting this waste to its forever home.”**

So next time you’re on I-25 and see a truck with three giant containers, you’ll know that it’s transporting safely packed materials in support of the national security mission — and it’s a lot more than just taking out the trash.